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10/651,449	08/29/2003	Yunbiao Wang	16869B-077200US	8740

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EXAMINER	
ODOM, CURTIS B	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/651,449	WANG, YUNBIAO	
	Examiner	Art Unit	
	Curtis B. Odom	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *6-9* is/are allowed.

6)☒ Claim(s) *1-5 and 10-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The amendments/arguments filed on 1/8/2007 have been entered and thus the rejection of claims 1-14 under U.S.C 112 second paragraph has been withdrawn. However, Applicant's arguments with regards to the rejection under U. S. C 103(a) have been fully considered but they are not persuasive. Applicant has amended the independent claims 1 and 10 to recite "a received signal comprising one or more reflected signals and a line-of-sight signal" and "wherein the smallest of the time values represents the arrival time of the line-of-sight signal". Rick et al. (previously cited in Office Action 10/4/2006) further discloses the earliest (first) peak in the correlation represents a time of arrival of the received signal (see sections 0006 and 0115). Rick et al. further discloses the earliest arriving non-sidelobe peak represents the time of arrival of a line-of-sight signal (see section 0007) wherein the received signal also includes multipath (reflected) signals. Therefore, it is the understanding of the Examiner that based on the above disclosure that Rick et al. discloses the non-sidelobe peak with the earliest time represents the time of arrival of a line-of-sight signal.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 11 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 11 recites computer program code without a computer readable medium. MPEP 2106.01 [R-5], Section I states the following:

Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035. Accordingly, it is important to distinguish claims that define descriptive material per se from claims that define statutory inventions.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rick et al. (previously cited in Office Action 10/4/2006) in view of Glazko et al. (previously cited in Office Action 10/4/2006).

Regarding claim 1, Rick et al. discloses a method of detecting peaks in a multipath channel through correlation (see section 0059) comprising:

receiving (see Fig. 2B) a transmitted pilot signal (section 0043) as a received signal, the transmitted pilot signal formed by correlating (modulating) a pilot information signal with PN sequence as discloses in section 0043, wherein the received signal includes one or more multipath (reflected) signals and a line-of-sight signal as disclosed in section 0007;

correlating (Fig. 2B, blocks 202) the representation of pilot signal with the PN sequence to produce a correlated (evaluation) signal (see sections 0063-0064) representing a correlation value between the signal and the PN code sequence, wherein the correlation signal comprises a plurality of peak values as shown in Fig. 3A and 3B;

identifying (Fig. 2B, block 204) a first peak value in the correlated signal (see sections 0061 and 0066);

determining a position in the correlation signal of the first peak value using a time value represented by the chip time offset (see section 0071) wherein the chip time offset is representative of the position of the peak value in the correlated signal;

determining a threshold value (see section 0073) based on the energy of the peaks or the pulses of correlated signal determined by the correlation function;

comparing the threshold value (section 0072) with the first peak value to produce a comparison result, wherein based on the comparison result, determining whether to:

produce a new correlated signal based on first correlated signal by again performing correlation on signals (see section 102) in the "deep" group for which a first correlation result does not produce a peak exceeding a first threshold (T1h) as described in section 0098, but produces a peak exceeding a second thresh`old (T1n) as described in section 0099; and

repeat the detection of a peak using the new correlated signal (see section 0102-0104), if the energy of the first main correlated signal peak during the first correlation does not exceed a threshold value (T1h) as described in section 0098, which accumulates a plurality of first peak values by recording the positions of the strongest peak from the first (old) correlation and the strongest peak from the second (new) correlation (see section 0110), wherein the peaks are detected from the correlations from the repetition of the above steps;

wherein the first (earliest time) non-sidelobe peak represents the arrival time of the line-of-sight signal (see sections 0007, 0062, and 0115).

Rick et al. does not disclose a position of an impulse response corresponds to the first peak value whose associated time is the earliest.

However, Rick et al. further discloses the earliest peak in the correlation represents a time of arrival of the received signal (see sections 0006 and 0115). Glazko et al. further discloses providing a correlation of the received signal using a matched filter (see section 0028) and detecting peaks from the correlation corresponding to the time of arrival of a received signal (see section 0030). Rick et al. further discloses the earliest arriving largest peak represents the start of the channel impulse response. Rick et al. also discloses the time of arrival of the signal

corresponds to the start of the channel impulse response (see section 0012). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to detect the start of the channel impulse response based on the time of arrival in Rick et al. as disclosed by Glazko et al. since Glazko et al. states the impulse response can be used to maximize the signal-to-noise ratio of a decision variable of the received signal (see section 0030).

Regarding claim 3, Rick et al. further discloses the threshold can be based on a sidelobe value of the correlation to limitate the false alarm probability (see section 0073).

Regarding claim 5, Rick et al. further discloses the method of claim 1 configured on a data processing unit such as a DSP (see sections 0068 and 0138) stored on a memory such as a processor readable medium and provided as computer program code segments (instructions) for a processor or computer (see section 0138).

6. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rick et al. (previously cited in Office Action 10/4/2006) in view of Motoyoshi et al. (previously cited in Office Action 10/4/2006).

Regarding claim 10, Rick et al. discloses a signal detection processor (Fig. 2B) comprising:

means (see Fig. 2B) for receiving a sampled digital pilot signal (see sections 0053-0054), the digital signal representative of a transmitted pilot signal, the transmitted pilot signal formed by correlating (modulating) a pilot information signal with PN sequence as discloses in section 0043, wherein the received signal includes one or more multipath (reflected) signals and a line-of-sight signal as disclosed in section 0007;

means for correlating (Fig. 2B, blocks 202) the digital pilot signal with the PN sequence to produce a correlated signal (see sections 0063-0064) representing a correlation value between the signal and the PN code sequence;

means (Fig. 2B, block 204) for detecting a peak value in the correlated signal (see section 0066) including associating a time value represented by the chip time offset (see section 0071) wherein the chip time offset is representative of the position of the peak value in the correlated signal;

means for determining a threshold value (see section 0073) based on the energy of the peaks or the pulses of correlated signal determined by the correlation function;

means for producing a new correlated signal by again performing correlation on signals (see section 102) in the "deep" group for which a first correlation result does not produce a peak exceeding a first threshold (T1h) as described in section 0098, but produces a peak exceeding a second threshold (T1n) as described in section 0099; and

means for repeating the detection of a peak using the new correlated signal (see section 0102-0104), if the energy of the first main correlated signal peak during the first correlation does not exceed a threshold value (T1h) as described in section 0098, which accumulates a plurality of peak values by recording the positions of the strongest peak from the first (old) correlation and the strongest peak from the second (new) correlation (see section 0110);

wherein the first (smallest time) non-sidelobe peak represents the arrival time of the line-of-sight signal (see sections 0007, 0062, and 0115).

Rick et al. does not specifically disclose producing a new correlated signal from the correlated signal.

However, Motoyoshi et al. discloses detecting a maximum (peak) of a correlation waveform (section 0039). Motoyoshi et al. further discloses producing a new correlation signal from the correlated signal by eliminating an autocorrelation waveform from the correlation signal (see section 0042). The maximum (peak) of the correlation (integration) values are then detected as a synchronization point. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the signal detection of Rick et al. with the removal of the autocorrelation waveform as disclosed by Motoyoshi et al. to produce a new correlation signal since Motoyoshi et al. states the autocorrelation waveform located in the sidelobes of the correlation signal can deteriorate detection of a maximum correlation (synchronization) point of the received signal (see section 0009).

Regarding claim 11, Rick et al. further discloses the means of claim 10 can provided as computer program code (instructions) for a computer (see section 0138).

Regarding claim 12, Rick et al. further discloses the means of claim 10 can be performed on a data processing unit such as a DSP (see sections 0068 and 0138).

Regarding claim 13, Rick et al. further discloses the threshold can be based on a sidelobe of the correlation to limitate the false alarm probability (see section 0073).

Regarding claim 14, Motoyoshi et al. further discloses generating an autocorrelation replica signal (template signal) and using (subtracting) this signal to eliminate the autocorrelation waveform from the correlation signals (see section 0042 and 0052). Therefore, it would have been obvious to include this feature since Motoyoshi et al. states the autocorrelation waveform located in the sidelobes of the correlation signal can deteriorate detection of a maximum correlation (synchronization) point of the received signal (see section 0009).

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rick et al. (US 2003/0081662) in view of Glazko et al. (previously cited in Office Action 10/4/2006) as applied to claim 1, and in further view of Motoyoshi et al. (previously cited in Office Action 10/4/2006).

Regarding claim 2, Rick et al. and Glazko et al. do not disclose producing a new correlated signal from the correlated signal comprises subtracting a template signal from the correlation signal.

However, Motoyoshi et al. discloses detecting a maximum (peak) of a correlation waveform (section 0039). Motoyoshi et al. further discloses producing a new correlation signal from the correlated signal by eliminating an autocorrelation waveform from the correlation signal (see section 0042). Motoyoshi et al. discloses generating an autocorrelation replica signal (template signal) and using (subtracting) this signal to eliminate the autocorrelation waveform from the correlation signals (see section 0042 and 0052). Therefore, it would have been obvious to include this feature in the method of Rick et al. and Glazko et al. since Motoyoshi et al. states the autocorrelation waveform located in the sidelobes of the correlation signal can deteriorate detection of a maximum correlation (synchronization) point of the received signal (see section 0009).

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rick et al. (US 2003/0081662) in view of Glazko et al. (previously cited in Office Action 10/4/2006) as applied to claim 1, and in further view of Ertel et al. (previously cited in Office Action 10/4/2006).

Regarding claim 4, Rick et al. discloses the threshold may be based on a combination of energy of the first and second peaks of the correlation signal (see section 0073), however, Rick et

al. and Glazko et al. do not disclose the threshold value is based a ratio between the first correlation peak vale and other peak values of the correlation signal.

However, Ertel et al. discloses using a minimum correlation threshold (see column 7, lines 50-63) to detect a correlation peak (match) wherein the threshold is set to a ratio between an initial correlation peak C(K) and a subsequent correlation peak C_p. Therefore, it would have been obvious to one skilled in the art to modify the threshold of Rick et al. and Glazko et al. to use a minimum threshold as taught by Ertel et al. since Ertel et al. states this minimum threshold provides a criteria to ensure the correlation match (peak) is valid (see column 7, lines 50-63).

Allowable Subject Matter

9. Claims 6-9 are allowable over prior art references.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Curtis Odom
March 29, 2007